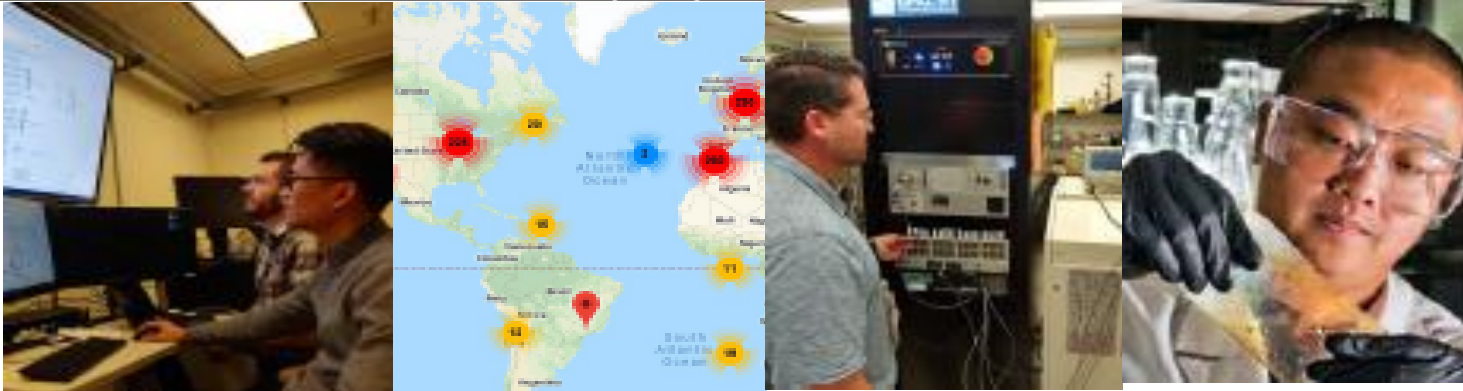


ENERGY STORAGE DEMONSTRATION PROJECTS — OE-ES PEER REVIEW PROGRAM OVERVIEW

10/26/21



PRESENTED BY

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PROJECT TEAM



Sandia Team

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Russ Weed (Clean Tech)

Other Labs

Matt Paiss (PNNL)

Charlie Vartainian (PNNL)

Industry Partners

CEC - Cordova, AK

CEC – California Energy Commission

CESA - Clean Energy States Alliance of Vermont

EPB – Chattanooga, Tn

ANZA – Anza, CA

Alliant – Decorah, Iowa

Puerto Rico mountain Consortium

APS – Albuquerque

GMP - Vermont

NRECA – Nationwide

AVEC - Alaska



DEMONSTRATION PROJECTS – WHAT WE DO AND WHY



- Provide project implementation support from initiation thru operation.
 - Engineering analysis
 - Design, procurement, construction consulting
 - RFP development, vet technologies, review construction documentation
 - Safety design
 - Commissioning and operation support
 - monitoring
 - Installation best practices
 - Training
- Public outreach through papers, Webinars, Presentations
- WHY IS THE PROGRAM IMPORTANT?
 - To Help develop more safe, effective, and reliable systems
 - Demonstrate benefits
 - Inform codes and standards & best practices for installation and operation
 - Operational data gathering and analysis
 - Learn...Learn...Learn!!



PROJECT 2021 MILESTONES

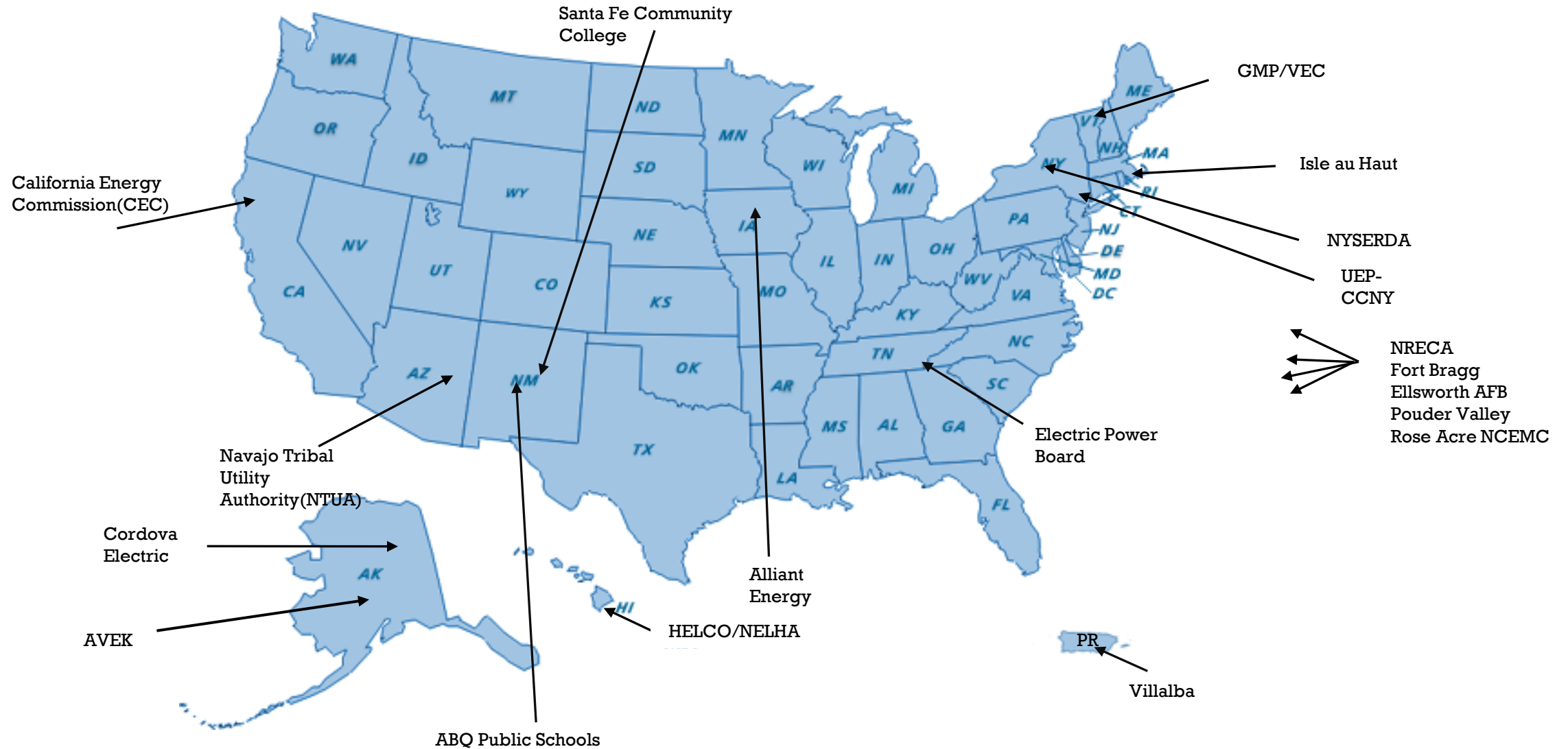
- Completed
 - Alliant
 - NRECA –Poudre Valley
 - Cordova
 - Isle a Haut analysis
 - ANZA analysis
 - Puerto Rico Mountain Consortium Study
 - Santa Fe CC
- In progress projects
 - Albuquerque Public Schools (New Mexico)
 - NRECA- Ft. Bragg, Ellsworth AFB, NCEMC
 - Vermont
 - AVEC
 - Expression of Interest solicitation
 - Social Equity and rural
 - ES interface for EV fast charging
 - Cal Energy Commission MOU
 - Energy Storage 4 Social Equity (PNNL)
 - Indian Energy – Picuris , Seminole, NTUA

Alliant



Cordova





PROJECT CHALLENGES/OPPORTUNITIES

- Challenges
 - Funding and approval by partners
 - Delays in project implementation – **Long lead times**
 - Data collection / remote communication and data storage
 - Control & System failures
 - Unclear codes and standards
 - Agreed upon safety systems
 - Implementing Commissioning on a grid installed system
- Opportunities
 - New technologies, applications and business models
 - Long Duration ES Technologies
 - Clear and concise codes and standards
 - Develop better safety systems
 - Fire suppression systems
 - Early warning
 - Social Equity Emphasis
 - Learn... Learn... Learn



Pouder
Valley



- DOE Memorandum of Understanding with the California Energy Commission signed in 2021.
 - Share information on Energy Storage projects that enables each party to learn from the other's experiences, prevent duplication and leapfrog development.
- VET Shovel-ready high TRL systems
- VET lower TRL technologies
- Focus on data for research
- Representative interests:
 - Operating Lithium-ion projects. Trends in battery or system operation and aging.
 - Non-lithium technologies. (CEC sees no need to further fund commercially available technology.)
 - **Long duration energy storage.** Two groups:
 - 4-10 hr duration;
 - >10 hr duration to days, weeks

NELHA Mixed Acid Electrolyte Removal



Flow Battery Recycling & Disposal

- 100kW/400kWh VRFB at Hawaii clean energy lab facility
- 21,500L of electrolyte (-2 pH)
- 20 ft container with 3 stacks, 2 pumps, 2 tanks, mechanical & electrical (DC) balance of system
- Stakeholders partnering on recycling & disposal
- Recycling of electrolyte, or reprocessing
- Recycling of hardware, or responsible disposal



LOOKING FORWARD FY 22 AND BEYOND



- NEXT STEPS
 - Social Equity
 - ES4SE – Project implementation
 - EOI
 - Fast Charging
 - Social Equity
 - Rural and Special Interest
- FURTHER WORK AND RESEARCH
 - Collect operational and financial Data and display
 - Need to better understand safety systems for ES
 - Support Ca. Energy Commission
 - Vet ES technologies
 - Long duration ES
 - Disposal issues
 - Support NYSERDA LDES program
- DISSEMINATION / OUTREACH
 - Reports, presentations, webinars



Source: SAtcitty

THANK YOU

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This work was Directed by Dr. Imre Gyuk through the Department of Energy, Office of Electricity Delivery and Energy Reliability (DOE-OE), Stationary Energy Storage Program.



Training



Cordova